

# Health promoting compounds in black currants – the start of a study concerning ontogenetic and genetic effects



***Michael Vagiri<sup>\*1</sup>, Eva Johansson<sup>\*\*</sup>, Kimmo Rumpunen<sup>\*</sup>***

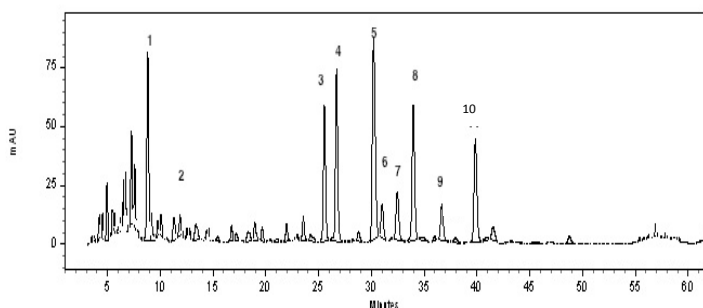
*<sup>\*</sup> Department of Plant Breeding and Biotechnology, SLU Balsgård, Fjälkestadsvägen 459, SE-291 94 Kristianstad, Sweden*

*<sup>\*\*</sup> Department of Agriculture – Farming Systems, Technology and Product Quality, SLU, Box 104, SE-230 53 Alnarp, Sweden*

[1michael.rajeev.vagiri@slu.se](mailto:1michael.rajeev.vagiri@slu.se)



## HPLC chromatogram of phenols in leaves

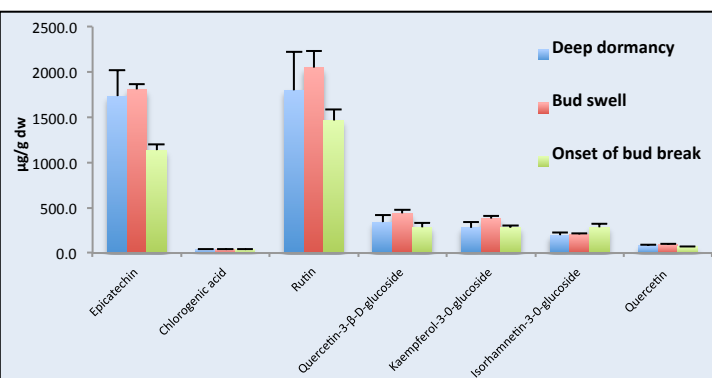


**Fig 1.** HPLC-DAD traces of specific phenols in leaves at 320nm. 1. Chlorogenic acid; 2. Epicatechin; 3. Rutin; 4. Quercetin glucoside; 5. Unknown; 6. Unknown; 7. Unknown; 8. Kaempferol glucoside; 9. Isorhamnetin glucoside; 10. Unknown

## Content of phenols in blackcurrant buds



**Fig 2.** Freeze dried buds for analysis of individual phenols (A) Deep dormancy (B) Bud swell (C) Onset of bud break



**Fig 3.** Differences in concentrations of specific phenols in buds collected from selection 8872-1 over three ontogenetic stages

## Perspectives

- On completion the study will provide,
  - Valuable information to growers, the processing sector and researchers.
  - Enhance the nutritional characteristics in the black currant plant material suitable to be grown in local climates.
  - Support the development of superior and resistant cultivars for sustainable and profitable black currant organic growing.

## Introduction

Different parts of the black currant shrub are rich in phenols with potential health benefits. Except for the fruits, little is known about the detailed composition of biochemical compounds in buds and leaves. In this study we plan to investigate the phenolic compounds in black currant buds, leaves and fruits during different developmental stages and three years.

## Objectives

- To identify and optimize the conditions for analysis of individual phenols in buds, leaves and fruits of blackcurrants
- Investigate genetic effects
- Study genotype environment interactions
- Reveal effects of ontogenetic stage on the content of ascorbic acid and polyphenols in black currant buds, leaves and fruits.



## Plant material

Black currants material of 3 advanced selections (8872-1, 8944-13, 9504-2-227) and 2 cultivars ('Poesia', 'Titania') grown in the South (Balsgård) and North (Öjebyn) of Sweden are used in the study. A sampling schedule is provided in Table 1. comprising 3 years (2011, 2012 and 2013).

Sample	Annually	Season 1	Season 2	Season 3
<b>Buds</b>	3 times	Autumn	Winter	Spring
<b>Leaves</b>	3 times	Spring	Early summer	Summer
<b>Fruits</b>	3 times	Green	Onset of ripening	Fully ripened

**Table 1.** Time plan for sampling of buds, leaves and fruits following their ontogenetic development

## Extraction and analysis

The samples were freeze dried, ground and three replicates for each sample were extracted with 1.5ml of 50% ethanol (v/v) using ultra sonic bath for 15 minutes. The extracts were then centrifuged for 10 min. The extracts were analyzed with HPLC-DAD coupled and a Synergy Hydro-RP 80A (250x 4.60 mm, 4 micron) column to separate and quantify major phenolic compounds.